

WHAT IS CLAIMED:

1. A semiconductor device comprising a plurality of semiconductor chips layered on a circuit substrate, wherein:

three of the plurality of semiconductor chips are respectively a first semiconductor chip, a second semiconductor chip, and a third semiconductor chip, each of which has a circuit formation surface and a reverse surface with respect to the circuit formation surface,

the first semiconductor chip being mounted on the circuit substrate or the third semiconductor chip in such a manner that the reverse surface of the first semiconductor chip faces the circuit substrate,

the second semiconductor chip (i) being mounted on the first semiconductor chip in such a manner that the reverse surface of the second semiconductor chip faces the circuit formation surface of the first semiconductor chip, and (ii) having protruded part formed by protruding at least one outer edge of the second semiconductor chip from an outer edge of the first semiconductor chip,

the first semiconductor chip and the second semiconductor chip being wire-boned with the circuit substrate;

the semiconductor device comprising a mounting-use bonding layer on the reverse surface of the second

semiconductor chip, and

the mounting-use bonding layer functioning as a bonding agent for mounting the second semiconductor chip on the first semiconductor chip, and filling a gap between (i) the circuit substrate or a third semiconductor chip, and (ii) the protruded part of second semiconductor chip.

2. A semiconductor device comprising a plurality of semiconductor chips layered on a circuit substrate, wherein:

two of the plurality of semiconductor chips are respectively a first semiconductor chip and a second semiconductor chip, each of which has a circuit formation surface and a reverse surface with respect to the circuit formation surface,

the first semiconductor chip being flip-chip connected on the circuit substrate in such a manner that the circuit formation surface of the first semiconductor chip faces the circuit substrate,

the second semiconductor chip (i) being mounted on the first semiconductor chip in such a manner that the reverse surface of the second semiconductor chip faces the circuit formation surface of the first semiconductor chip, and (ii) having protruded part formed by protruding

at least one outer edge of the second semiconductor chip from an outer edge of the first semiconductor chip,

the second semiconductor chip being wire-boned with the circuit substrate;

the semiconductor device comprising a mounting-use bonding layer on the reverse surface of the second semiconductor chip, and

the mounting-use bonding layer functioning as a bonding agent for mounting the second semiconductor chip on the first semiconductor chip, and filling a gap between (A) the circuit substrate, and (B) the protruded part of second semiconductor chip.

3. The semiconductor device as set forth in Claim 1, wherein:

a surface of the mounting-use bonding layer has the same shape as the reverse surface of the second semiconductor chip, the surface being in touch with the reverse surface of the second semiconductor chip.

4. The semiconductor device as set forth in Claim 2, wherein:

a surface of the mounting-use bonding layer has the same shape as the reverse surface of the second

semiconductor chip, the surface being in touch with the reverse surface of the second semiconductor chip.

5. The semiconductor device as set forth in Claim 1, wherein:

the mounting-use bonding layer forms, in the gap, a supporting member for supporting the protruded part; and

a surface of the supporting member has the same shape as the reverse surface of the protruded part, the surface being in contact with the reverse surface of the protruded part.

6. The semiconductor device as set forth in Claim 2, wherein:

the mounting-use bonding layer forms, in the gap, a supporting member for supporting the protruded part; and

a surface of the supporting member has the same shape as the reverse surface of the protruded part, the surface being in contact with the reverse surface of the protruded part.

7. The semiconductor device as set forth in Claim 1, wherein:

the mounting-use bonding layer is made of a thermosetting resin being in a solid state at ordinary

temperatures, being melted into a liquid state by heating, and being solidified by heat treatment after being melted.

8. The semiconductor device as set forth in Claim 2, wherein:

the mounting-use bonding layer is made of a thermosetting resin being in a solid state at ordinary temperatures, being melted into a liquid state by heating, and being solidified by heat treatment after being melted.

9. The semiconductor device as set forth in Claim 1, wherein:

the mounting-use bonding layer is made of an epoxy resin.

10. The semiconductor device as set forth in Claim 2, wherein:

the mounting-use bonding layer is made of an epoxy resin.

11. The semiconductor device as set forth in Claim 1 wherein:

the mounting-use bonding layer includes two layers, one of which is associated with the second semiconductor chip and is less meltable into a liquid state than the other

one of the two layers, which is associated with the first semiconductor chip.

12. The semiconductor device as set forth in Claim 2 wherein:

the mounting-use bonding layer includes two layers, one of which is associated with the second semiconductor chip and is less meltable into a liquid state than the other one of the two layers, which is associated with the first semiconductor chip.

13. The semiconductor device as set forth in Claim 1, wherein:

the mounting-use bonding layer is made of a liquid resin.

14. The semiconductor device as set forth in Claim 2, wherein:

the mounting-use bonding layer is made of a liquid resin.

15. A manufacturing method of a semiconductor device including a plurality of semiconductor chips layered on a circuit substrate, the method comprising the steps of:

mounting a first semiconductor chip, which is one of the plurality of semiconductor chips, (i) on the circuit substrate in such a manner that the circuit substrate faces a reverse surface of the first semiconductor chip with respect to a circuit formation surface thereof, or (ii) on a third semiconductor chip, which is another one of the plurality of semiconductor chips;

forming a mounting-use bonding layer on a reverse surface of a wafer and dicing the wafer into chips, each of which is a second semiconductor chip on which a mounting-use bonding layer is provided, the second semiconductor chip being still another one of the plurality of the semiconductor chips;

mounting the second semiconductor chip on the first semiconductor chip in such a manner that (a) a circuit formation surface of the first semiconductor chip faces a reverse surface of the second semiconductor chip with respect to a circuit formation surface thereof, (b) at least one outer edge of the second semiconductor chip is protruded from an outer edge of the first semiconductor chip so as to form protruded part of the second semiconductor chip, and (c) a supporting member for supporting the protruded part is formed from the mounting-use bonding layer; and

wire bonding the circuit substrate with the first

semiconductor chip and the second semiconductor chip.

16. A manufacturing method of a semiconductor device including a plurality of semiconductor chips layered on a circuit substrate, the method comprising the steps of:

    flip-chip bonding a first semiconductor chip, which is one of the plurality of semiconductor chips, on the circuit substrate in such a manner that a circuit formation surface of the first semiconductor chip faces the circuit substrate;

    forming a mounting-use bonding layer on a reverse surface of a wafer and dicing the wafer into chips, each of which is a second semiconductor chip on which a mounting-use bonding layer is provided, the second semiconductor chip being still another one of the plurality of the semiconductor chips;

    mounting the second semiconductor chip on the first semiconductor chip in such a manner that (i) a reverse surface of the first semiconductor chip with respect to the circuit formation surface thereof faces a reverse surface of the second semiconductor chip with respect to a circuit formation surface thereof, and (ii) at least one outer edge of the second semiconductor chip is protruded from an outer edge of the first semiconductor chip so as to form

protruded part of the second semiconductor chip, and (iii) a supporting member for supporting the protruded part is formed from the mounting-use bonding layer; and

wire bonding the circuit substrate with the first semiconductor chip and the second semiconductor chip.